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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/679,952      | 10/06/2003  | Digant P. Dave       | 119927-1068         | 3581             |

7590 12/27/2005

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| EXAMINER |
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LEE, JOHN D

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| ART UNIT | PAPER NUMBER |
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2874

DATE MAILED: 12/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

54

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|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 10/679,952             | DAVE ET AL.         |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | John D. Lee            | 2874                |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

(election)

- 1) ☒ Responsive to communication(s) filed on 21 November 2005.
- 2a) ☐ This action is **FINAL**.      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 32-35 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22-25 and 36 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-15, 17, 18, 21 and 26-31 is/are rejected.
- 7) ☒ Claim(s) 4, 16, 19 and 20 is/are objected to.
- 8) ☒ Claim(s) 1-36 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

Applicant's election with traverse of Invention I (claims 1-31 and 36) in the reply submitted on November 21, 2005, is acknowledged. The traversal is on the ground(s) that a thorough search of the subject matter for Invention I would necessarily include a search for the subject matter of Invention II, because claims 32-35 characterize elements as provided by claims 1-31 and 36. This is not found persuasive because the searches would not and do not overlap. The non-elected claims of Invention II (claims 32-35) describe very detailed and specific mathematical methods which are not at all a part of the subject matter of the Invention I claims (claims 1-31 and 36). As pointed out in the requirement for restriction, the methods of Invention II are classified in Class 702, and would be examined by an Examiner having totally different expertise and knowledge than the undersigned Examiner.

The requirement is still deemed proper and is therefore made **FINAL**.

Claims 32-35 stand withdrawn from further consideration by the Examiner, 37 CFR § 1.142(b), as being drawn to a non-elected invention.

The seven (7) sheets of drawing filed in this application on October 6, 2003, are acceptable.

The disclosure is objected to because of the following minor informalities. Appropriate correction is required. On page 1, line 3, the Provisional Patent Application Number is incorrectly identified. Number "60/251,658" should actually be "60/261,658". On page 1, line 4, the reference to U.S. Patent Application 10/044,421 should be updated to reflect that it is now U.S. Patent 6,665,456. On page 6, line 3, "FIGURE 6 depicts" should actually be "FIGURES 6A-6C depict". On page 6, line 5, "FIGURE 7 depicts"

should actually be "FIGURES 7A-7C depict". Applicant's cooperation is requested in correcting any other errors of which applicant may become aware in the specification.

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5-15, 17, 18, 21, and 26-31 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,459,570 to Swanson et al in view of Schmitt (IEEE JOURNAL OF SELECTED TOPICS IN QUANTUM ELECTRONICS article). Swanson et al discloses a fiber-based optical low-coherence reflectometer comprising a polarization-maintaining source path, a polarization-maintaining reference path, a polarization-maintaining sample path optically aligned with a focusing lens (for focusing light on a sample) and a quarter wave retarder, and a polarization-maintaining detection path, wherein all four paths are connected to a polarization-maintaining path coupler. See Figure 6 of Swanson et al, along with column 4, lines 59-61. Swanson et al does not clearly show or disclose whether or not a collimating lens is also included in the polarization-maintaining sample path. Schmitt, however, in the same type of fiber-based optical low-coherence reflectometer (see Figure 4(c)), clearly shows that the sample path should include both a collimating lens and a focusing lens in front of the sample to be illuminated. Because these reflectometers are nearly identical, it would have been obvious for the person of ordinary skill in the art to ensure that the polarization-maintaining sample path of Swanson et al (Figure 6) includes both a collimating lens and a focusing lens in front of the sample to be illuminated. Regarding applicant's claim 2,

Art Unit: 2874

the polarization-maintaining path coupler of Swanson et al separates light into polarization-maintaining sample and reference paths while maintaining energy separation of optical signals. Regarding applicant's claim 3, the Swanson et al source path includes a polarizer, so that the portion of polarization-maintaining optical fiber to the left of the polarizer is a *first* polarization-maintaining optical fiber and the portion of polarization-maintaining optical fiber to the right of the polarizer is a *second* polarization-maintaining optical fiber. Regarding applicant's claims 5 and 18, the optical elements positioned in the polarization-maintaining sample path of Swanson et al necessitate the polarization-maintaining optical fiber being more than one polarization-maintaining optical fiber (since the same fiber does not go *through* the optical elements). Although the use of a connector (of any particular type) is not disclosed in this path, its presence would have been obvious in order to connect the plural fiber portions. The polarization-splitting, dual sub-path, dual photodetector arrangement for the polarization-maintaining detection path of Swanson et al (as in applicant's claims 6 and 7) is clearly shown by both Schmitt and Swanson et al. The elements of applicant's claim 8 are also shown by Swanson et al (a "computer" being a "processor"). The details of individual elements set forth in applicant's claims 9-13 are merely implementation details which would be chosen according to specific applications of the reflectometer. These details would therefore have been obvious in Swanson et al/Schmitt depending upon the specific use of the apparatus. Speaking of uses, those uses claimed in claim 15 are certainly alluded to by both Schmitt and Swanson et al. Regarding applicant's claim 17, note that Swanson et al specifically mentions that the light back-scattered from the sample is elliptically polarized (column 13, lines 11-14). The limitation of applicant's claim 21 would be

inherently met by the reflectometer represented by the proposed combination of Swanson et al and Schmitt. Applicant's claims 26 and 27 describe subsets of the reflectometer discussed above. These subsets would therefore obviously have been present in the reflectometer represented by the proposed combination of Swanson et al and Schmitt. The background discussion in both references further makes obvious the limitations of applicant's claims 28 and 29. The method of applicant's claim 30 essentially corresponds to the apparatus discussed above, except for the added limitation that light in the polarization-maintaining reference path is directed into a rapid scanning delay line. Note that elements 32 and 39 of Swanson et al perform this exact same function (rapid scanning or dithering), so that the claim 30 method would have been obvious to a person of ordinary skill in view of the disclosures of Swanson et al and Schmitt. The system of claim 31 represents a combination of features which were all discussed above, so that (for the reasons given above) this claimed system would have been obvious to a person of ordinary skill in view of the disclosures of Swanson et al and Schmitt.

Claims 4, 16, 19, and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record, particularly Swanson et al and Schmitt, does not disclose or reasonably suggest a polarization-maintaining reference path in a fiber-based optical low-coherence reflectometer which comprises two separate polarization-maintaining optical fibers, one of which is connected to a phase modulator and the other of which is connected to an optical delay line.

Claims 22-25 and 36 are allowable over the prior art of record. None of the prior art of record, considered alone or taken together, discloses or reasonably suggests a method of using a fiber-based optical low-coherence reflectometer of the type claimed, wherein the polarization-maintaining reference path is directed to an optical delay line with dispersion control. Note that in the Swanson et al reference discussed above, the sample and reference paths are made equal in order to control dispersion. The reflectometer of claim 36 is patentably distinct because the prior art of record does not disclose or reasonably suggest a polarization-maintaining reference path in a fiber-based optical low-coherence reflectometer which comprises two separate polarization-maintaining optical fibers, one of which is connected to a phase modulator and the other of which is connected to an optical delay line.

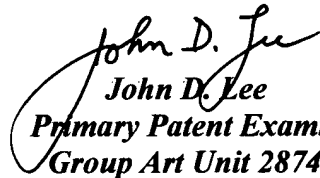
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited U.S. Patent to Toofan shows an optical sampling path which includes a source, a collimating lens, a focusing lens, a polarizing beam splitter, polarizers, and a quarter wave retarder. Other related fiber-based optical low-coherence reflectometers can be seen in the cited U.S. Patent to Swanson et al (5,321,501) and in the cited article by Rollins et al. The cited U.S. Patent to Dave et al has matured from applicant's parent application Serial Number 10/044,421, filed on January 11, 2002. The cited U.S. Patents to Wentz, Tabata et al, Nishiura, and Ota were discussed during the prosecution of parent application Serial Number 10/044,421, and are relevant for the reasons developed therein.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103(a), the Examiner presumes that the subject matter of the

Art Unit: 2874

various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR § 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the Examiner to consider the applicability of 35 U.S.C. § 103(c) and potential 35 U.S.C. §§ 102(e), (f) or (g) prior art under 35 U.S.C. § 103(a).

Any inquiry concerning the merits of this communication should be directed to Examiner John D. Lee at telephone number (571) 272-2351. The Examiner's normal work schedule is Tuesday through Friday, 6:30 AM to 5:00 PM. Any inquiry of a general or clerical nature (i.e. a request for a missing form or paper, etc.) should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562, to the technical support staff supervisor (Team 8) at telephone number (571) 272-1564, or to the Technology Center 2800 Customer Service Office at telephone number (571) 272-1626.

  
**John D. Lee**  
**Primary Patent Examiner**  
**Group Art Unit 2874**